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| 10/733,960 | 12/11/2003 | John A. McClure | 3090 | 8741 |

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| EXAMINER | |
|---|---|
| WEISKOPF, MARIE | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3661 | |

DATE MAILED: 03/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/733,960 | MCCLURE ET AL. | |
| | Examiner | Art Unit | |
| | Marie A. Weiskopf | 3661 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *27 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/7/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of species II in the reply filed on 1/27/06 is acknowledged.

### *Claim Objections*

2. Claim 13 objected to because of the following informalities: Claim 13 lacks antecedent basis for the turning radii compensation. Said turning radii compensation is not mentioned in any of the above claims, Examiner suggests changing to a turning radii compensation. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Bevly et al (US 6,434,462). Bevly et al discloses a GPS control of a tractor-towed implement comprising:

- In regard to claim 1, a position control system for positioning a working component relative to a motive component (Abstract) comprising:
    - An articulated connection between the components, which in this case is a tongue which is pivotally coupled to the drawbar (Column 2, lines 45-48)

- A locating device associated with the motive component and adapted for providing an output corresponding thereto (Column 3, lines 28-38)
- A controller connected to the locating device and adapted for providing an output for positioning the components relative to each other (Column 3, lines 28-38)
- A positioning device connected to the controller and at least one of the components and adapted for positioning the one component relative to the other in response to the controller output (Column 3, lines 39-64)

- In regard to claim 2, the system further comprising:
  - The locating device comprising a first locating device and including a DGPS receiver adapted for providing GPS output corresponding to the position of the motive component (Column 3, lines 33-38)
  - A second locating device associated with the working component and adapted for providing an output corresponding thereto (Column 3, lines 28-38)
  - The output of the second locating device locating the working component in relation to the motive component (Column 3, lines 28-38)
  - The positioning device being operably connected to the articulated connection (Column 3, lines 39-64)
- In regard to claim 19, a method of positioning a working component relative to a motive component (Abstract), which method comprises the steps of:

- Providing an articulated connection between the components (Column 2, lines 45-48)
- Providing a controller (Column 3, lines 28-38)
- Generating a signal corresponding to the motive component and inputting same to the controller (Column 3, lines 28-38)
- Positioning the working component relative to the motive component in response to the first component signal input (Column 3, lines 28-38)

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 3, 4, 8, 9, 12, 15, and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bevly et al (US 6,434,462) in view of McClure et al (US 6,539,303.) Bevly et al is discussed above and McClure et al discloses a GPS derived swathing guidance system.

- In regard to claim 3, Bevly et al fails to disclose the controller being adapted to store DGPS-based straight and curved desired tracks, and providing position-correcting output to the positioning device in response to deviations of the motive component from a desired track. McClure et al, however, discloses a GPS derived swathing guidance system. This system stores a desired track, straight

or contour, and provides position-correcting output to the positioning device in response to deviations of the motive component from a desired track. (Column 4, lines 19-38) It would have been obvious to one having ordinary skill in the art at the time of the invention to adapt the controller of Bevly et al to be able to store DGPS-based straight and curved desired tracks in order to correct the position for the stored path which is stored in memory as discussed by Bevly et al. (Column 7, lines 60-67)

- In regard to claim 4, Bevly et al discloses the system comprising:
    - The articulated connection comprising a power-actuated hitch including a laterally-movable drawbar and a hitch pin mounted thereon and connected to the working component (Column 2, lines 42-56)
    - The positioning device including the hitch (Column 3, lines 38-64)
    - The controller being preprogrammed to laterally shit the hitch in response to deviations of the motive component from a respective desired track whereby the hitch is adapted to generally follow the desired path. (Column 7, lines 60-67)
- In regard to claim 8, Bevly et al fails to disclose the steering subsystem including a display providing cross-track error and heading information to an operator and the steering guide subsystem being connected to the controller whereby the steering display information is based on GPS data. McClure et al discloses a display providing cross-track error and heading information to an operator. (Column 7, lines 34-44; Figure 1) McClure et al also discloses the steering guide

subsystem being connected to the controller whereby the steering displaying information is based on GPS data. (Column 4, lines 42-53) It would have been obvious to one having ordinary skill in the art at the time of the invention to use the steering subsystem provided by McClure et al with the invention of Bevly et al in order to provide a display for the operator of the motive component to be able to make sure the motive component is on track and be able to make any corrections needed to the motive or working components.

- In regard to claim 9, Bevly et al fails to disclose an automatic steering subsystem connected to the motive component and to the controller, the automatic steering subsystem being adapted to automatically guide the motive component along a desire track, however, McClure et al does disclose this. (Column 4, lines 6-18) It would have been obvious to one having ordinary skill in the art at the time of the invention to include the automatic steering subsystem as taught by McClure et al with the GPS control of a tractor implement as discussed by Bevly in order to accurately guide the motive component along the desired track as discussed by Bevly et al. (Column 7, lines 60-67)
- In regard to claim 12, Bevly et al fails to specifically disclose a straight line operating mode and a contour operating mode adapted for guiding the implement along a relatively straight-line track or a curvilinear track, McClure et al, however, does disclose the two operating modes. (Column 4, lines 20-38) It would have been obvious to one having ordinary skill in the art at the time of the invention to have a straight line and contour operating mode in order to guide the motive

component in either a straight line or curved track. McClure et al discusses that the method of characterizing a desired path varies depending on whether a parallel mode or a contour mode has been set by operation of the switches, therefore it would be desirable and obvious to create an operation mode for either a straight-line track or a curvilinear since the paths are characterized differently. (Column 6, lines 7-10)

- In regard to claim 15, Bevly et al fails to disclose a display device including an arcuate array of indicator lights, the indicator light array having a generally downwardly convex configuration, and the controller being connected to the display device. McClure et al discloses:
    - A display device including an arcuate array of indicator lights adapted for displaying an approximate real-time position of the motive component relative to a desired track thereof. (Column 4, line 66 – Column 5, line 34; figure 2)
    - The indicator light array having a generally downward convex configuration with a center light including a motive component position approximately over the desired track and cross-track error of the motive component position being proportionally indicated by corresponding multiples of indicator lights to each side of the center light. (Column 4, line 66 – Column 5, line 34; figure 2)
    - The controller being connected to the display device whereby the display device receives motive component position output from the controller and

displays representations of the motive position in response thereto. (Column 4, line 66 – Column 5, line 34; figure 2)

It would have been obvious to one having ordinary skill in the art at the time of the invention to include the display of McClure et al with the invention of Bevly in order to be able to accurately track where the working component is compared to the track because as discussed in Bevly et al it is desired to know the position of the implement. (Column 7, lines 61-67) Although McClure et al does not track the position of the implement but the position of the motive component, it would have been obvious to also track the position of the working component since the working component has a GPS receiver attached to it as disclosed in Bevly et al, discussed previously.

- In regard to claim 20, Bevly et al discloses having a stored path in memory and storing the desired implement position in terms of the stored path in memory (Column 7, lines 60-67), however, fails to disclose the stored path being straight-line or contour track for the motive component, guiding the motive component along the desired track and determining deviation of the motive component from the desired. McClure et al discloses the above as discussed previously. McClure et al discloses the stored path being straight-line based or a contour track for the motive component, guiding the motive component along the desired track and determining deviation of the motive component from the desired track (Column 4, lines 19-38). It would have been obvious to one having ordinary skill in the art at the time of the invention to adapt Bevly et al with stored path and

deviations of McClure et al to be able to efficiently follow the stored path already stored in Bevly et al.

- In regard to claim 21, Bevly et al fails to disclose defining the desired track and the motive component deviation therefrom with GPS coordinates, inputting the GPS coordinates to the controller and comparing the desired track and deviation GPS coordinates. McClure et al discloses a system which stores program routines which receive settings and inputs from the switches which decide which path the motive component should take and then the controller cooperates with the GPS receiver to store detected positions and to determine the extent and direction of position or path discrepancy. (Column 4, lines 6-18) It would have been obvious to one having ordinary skill in the art at the time of the invention to include the system of McClure et al in order to be able to accurately keep track of where the working component is based on the desired track as discussed in Bevly et al (Column 7, lines 61-67). It is desired to know where the working component is in regard to the track in order to provide accurate planting for an agricultural tractor for instance.
- In regard to claim 22, Bevly et al fails to disclose generating a radius of curvature through a contour track of the motive component, smoothing the radius of curvature and positioning the working component with respect to the smoothed radius of curvature, however, McClure et al does disclose this. (Column 6, line 58 – Column 7, line 11) It would have been obvious to one having ordinary skill in the art at the time of the invention to use the smoothing technique discussed

by McClure et al for a radius of curvature and positioning the working component with respect to the smoothed radius of curvature because McClure et al teaches that it is used to in order to avoid erratic operation of the steering mechanism. (Column 7, lines 5-11)

- In regard to claim 23, Bevly et al discloses:
    - Providing a Follow GPS/Guidance operation mode of the controller (Column 3, lines 28-37)
    - Compensating for motive component deviation from the desired track (Column 7, line 61 – Column 8, line 4)
    - Positioning the working component on the desired track. (Column 7, line 61 – Column 8, line 4)

7. Claims 5, 6 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClure et al (US 6,539,303) as applied to claims 4 and 21 above, and further in view of Miller (US 6,631,916.) McClure et al is discussed above and Miller discloses a guidance system for pull-type equipment.

- In regard to claim 5, McClure et al discloses having a steering correction angle which is calculated by the controller and can be used with an automatic steering mechanism. Bevly et al, as discussed previously, discloses controlling the implement being towed to follow a motive component (Column 3, lines 38-65) It would have been obvious to use the steering correction angle, which can be used for curvature-correcting and the system of Bevly et al would be able to easily adjust the hitch to be on the desired track. Bevly et al and McClure et al

fail to disclose a tilt sensor mounted on one of the components and the system being programmed with a tilt-correcting function. Miller discloses a tilt sensor mounted on one of the components and providing an output corresponding to a tilt condition thereof (Column 2, lines 32-38) and the system being programmed with a tilt-correcting function adapted to proportionally, laterally shift the hitch in response to a detected tilt condition and a required compensating adjustment (Column 2, lines 55-59; Column 5, lines 55-67). It would have been obvious to one having ordinary skill in the art at the time of the invention to include the tilt correcting system and the curvature-correcting systems with Bevly et al in order to allow the implement to be able to follow a desired path as discussed in Bevly et al. (Column 7, lines 61-67)

- In regard to claim 6, McClure et al discusses the system adapted to function as a stationary or an on-the-fly system. (Column 6, lines 5-28) It would have been obvious to one having ordinary skill in the art at the time of the invention to be able to run the system from memory or be able to adjust to a new track for an on-the-fly system for the motive and working components.
- In regard to claim 24, Bevly et al discloses providing a Follow/Match Tracks operating mode of the controller (Column 7, line 61 – Column 8, line 4). Bevly et al, however, fails to disclose generating a tilt signal corresponding to a tilt of the system and inputting same to the controller, generating a curve compensation as a function of system speed and course change and positioning the working component on the motive component track in response to the tilt signal and the

curve compensation. Miller discloses, as discussed above, generating a tilt signal corresponding to a tilt of the system and inputting same to the controller (Column 2, lines 32-59; Column 5, lines 60-62). McClure et al discloses having a steering correction angle which is calculated by the controller and can be applied to an automatic steering mechanism, which could easily be used for curvature-correcting. It would have been obvious to one having ordinary skill in the art at the time of the invention to use the above corrections in order to provide a way for the implement to easily follow the desired track as discussed by Bevly et al and also discussed previously. (Column 7, lines 61-67)

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (US 6,631,916) as applied to claim 5 above, and further in view of Bernhardt et al (US 6,688,403.) Miller is discussed above and Bernhardt et al discloses a control system for a vehicle implement hitch. Bevly et al, McClure et al and Miller fail to disclose a turning radii compensation is based on motive component speed and rate-of-turn. Bernhardt et al, however, discusses having a turning radii compensation based on motive component speed and rate-of-turn. (Column 3, line 56 – Column 4, line 21) It would have been obvious to one having ordinary skill in the art at the time of the invention to use the turning radii compensation as discussed in Bernhardt et al in order to avoid collisions as discussed in Bernhardt et al.

9. Claims 7 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClure et al (US 6,539,303) as applied to claim 4 above, and further in view of Pellenc et al (US 6,336,066) and Carr et al (US 6,076,612). Bevly et al and McClure et al both

fail to disclose including an end-of-row compensating function for biasing the hitch laterally outwardly in response to the system detecting an end-of-row condition. McClure et al does discusses, as stated previously, cross-track deviation. Pellenc et al discloses being able to detect an end-of-row condition for a agricultural vehicle and Carr et al discloses biasing the hitch laterally depending upon the condition and what direction, etc. the tractor is going in. It would have been obvious to one having ordinary skill in the art at the time of the invention to include the simple detection of an end-of-row situation with biasing the hitch laterally in order to be able to control which direction the implement goes in and to be able to stay on the desired track for the operator.

10. Claims 10, 11, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClure et al (US 6,539,303) as applied to claim 4 above, and further in view of Allen et al (US 4,453,614) and Holloway et al (US 4,132,272). McClure et al and Bevly et al fail to disclose the configuration of the hitch. Allen et al and Holloway et al disclose the configuration of the hitch for a tractor and off-highway articulated vehicle.

- In regard to claim 10, Allen et al discloses:
    - A hitch having a clevis configuration (Column 4, lines 14-29)
    - The drawbar having a front end pivotably connected to the motive component and a trailing end connected to the working component (Figure 2)
    - A hydraulic subsystem including an hydraulic source associated with the motive component, a hydraulic actuator connected to the hydraulic

pressure source and to the drawbar for pivoting same and a hydraulic valve selectively controlling pressurized hydraulic fluid flow from the pressure source to the hydraulic actuator. (Column 4, lines 29-67)

Holloway et al discloses:

- The controller being connected to the hydraulic valve and adapted for controlling operation of same. (Column 5, line 62 – Column 6, line 31)
- The hitch including a hydraulic piston-and-cylinder unit connected to the hydraulic power source and to the side drawbar, the piston-and-cylinder unit being adapted for pivoting the drawbar (Column 5, line 62 – Column 6, line 31)
- The second locating device including a potentiometer connected to the piston-and-cylinder unit and adapted for providing an output signal proportional to a position of the piston-and-cylinder unit and corresponding to the orientation of the hitch. (Column 6, lines 1-31)

- In regard to claim 11, Holloway discloses a lateral hitch position control input adapted for biasing the drawbar left and right, a hitch centering control input adapted for centering the drawbar on the hitch and the left, right and center positions of the drawbar causing the potentiometer to provide corresponding output to the controller for controlling the position device. (Column 6, lines 1-67)
- In regard to claim 16, Holloway discloses the controller adapted for calibration relative to the valve potentiometer. (Column 6, lines 1-67)

- In regard to claim 17, it would have been obvious for McClure et al to include in the calibration of the controller as discussed previous to be relative to the factors comprising cross-track error, guidepath curvature and motive component tilt in order to be able to correctly position the implement upon the desired track.

It would have been obvious to one having ordinary skill in the art at the time of the invention to include the hitch configurations of both Holloway et al and Allen et al in order to be able position the hitch as necessary upon the desired track. The configurations of Holloway et al and Allen et al are known in the art and would be easy to implement with any system for controlling the position of a working implement.

11. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over McClure et al (US 6,539,303) as applied to claim 3 above, and further in view of Whitehead et al (US 6,469,663.) McClure et al is discussed above and Whitehead et al discloses a method and system for GPS and WAAS carrier phase measurements for relative positioning. Bevly et al and McClure et al disclose a DGPS system, however, fail to disclose DGPS correction capability utilizing a signal correction system from among the group consisting of: WAAS, EGNOS, and MSAS. Whitehead et al discloses a technique of accurately determining two points using carrier phase information from receivers capable of making code and carrier phase measurements on signals transmitted from GPS satellites as well as signals transmitted from WAAS, EGNOS and MSAS. (Abstract) It would have been obvious to one having ordinary skill in the art at the time of the invention to use these carrier phase measurement signals in order to be

able to provide the most accurate position of both the motive component and the working component as is well known in the art of GPS navigation.

12. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bevly et al (US 6,434,462) and McClure et al (US 6,539,303) and Miller (US 6,631,916) and Carr et al (US 6,076,612) and Bernhardt et al (US 6,688,403) and Whitehead et al (US 6,469,663) and Pellenc et al (US 6,336,066) and Holloway et al (US 4,132,272) and Allen et al (US 4,453,614). Claim 18 recites all of the limitations as claims 1-17 which are rejected above. Claim 18 is rejected for the same reasons as stated above. It would have been obvious to one having ordinary skill in the art at the time of the invention to combine the references for the reasons stated above, in order to provide a system which allows a motive component to tow a working component and allow the working component to be able to follow a designated path as is desired and discussed in Bevly et al.

***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US 5,810,095 to Orbach et al discloses a system for controlling the position of an implement attached to a work vehicle.
- US 6,314,348 to Winslow discloses a correction control for guidance control system
- US 5,935,183 to Sahm et al discloses a method and system for determining the relationship between a laser plane and an external coordinate system.

- US 2004/0210357 to McKay et al discloses an auto-steering apparatus and method
- US 6,501,422 to Nichols discloses a precise parallel swathing guidance via satellite navigation and tilt measurement.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marie A. Weiskopf whose telephone number is (571) 272-6288. The examiner can normally be reached on Monday-Thursday between 7:00 AM and 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on (571) 272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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THOMAS G. BLACK
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GROUP 3661